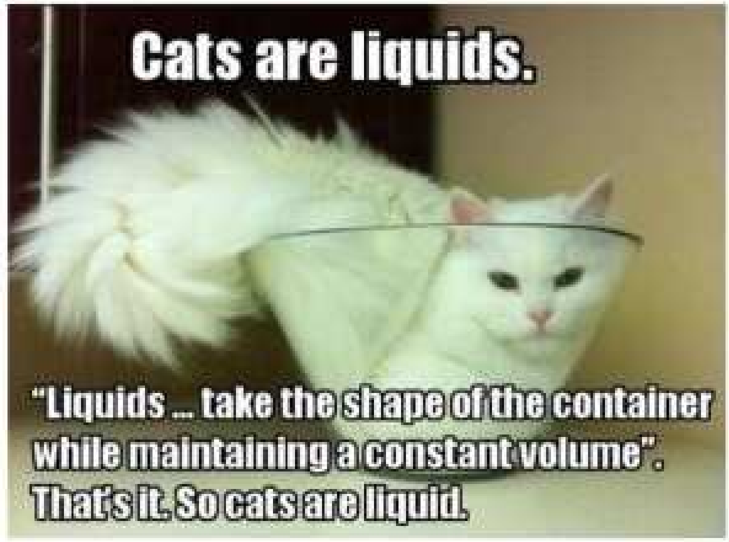
Conversions

(some are exact and some are rounded off and approximate)

1 cm	=	10 mm
1 inch	=	2.54 cm
1 foot	=	0.3048 m
1 foot	=	12 in
1 yard	=	3 ft
1 metre	=	100 cm
1 metre	=	3.280839895 ft
1 furlong	=	660 ft
1 km	=	1000 m
1 km	=	0.62137119 mi
1 mile	=	5280 ft
1 mile	=	1.609344 km



$$A_{cylinder} = 2\pi r^2 + 2\pi rh$$

$$A_{rect.prism} = 2(lw + wh + lh)$$

$$V_{cylinder} = \pi r^2 h$$

$$V_{rect.prism} = lwh$$

$$A_{sphere} = 4\pi r^2$$

$$A_{hemisphere} = 3\pi r^2$$

$$V_{sphere} = \frac{4}{3}\pi r^3$$

$$V_{hemisphere} = \frac{2}{3}\pi r^3$$

$$A_{right.pyramid} = \frac{1}{2}s(base.perimetre) + (base.area)$$

$$A_{cone} = \pi r^2 + \pi rs$$

$$V_{pyramid} = \frac{1}{3}lwh$$

$$V_{cone} = \frac{1}{3}\pi r^2 h$$

SECTION 1.1: IMPERIAL MEASURES OF LENGTH p. 4

In 1976, Canada adopted the **SI units** (Système International d'Unités, or Metric) to measure length. Many construction and manufacturing industries and trades continue to use __________ ______, or a mix of both units. Today, Canadians typically use a mix of metric and imperial measurements in their daily lives, and so it is important to be "fluent" in both systems. We tend to know our height (ft) and weight (lb) and size of our houses (square feet) and say how many pounds we can "bench" (lift in chest press) in **imperial units.** But we generally use **metric** for weather in degrees Celsius, buy gasoline and milk in litres, set speed limits in kilometres per hour (km/h), read road signs and maps displaying distances in kilometres, talk of rain and snowfall in millimitres and centimetres,. The United States and in many ways Britain continue to generally use the Imperial system (although metric is used in various industries).

In the Imperial system, more than 300 different units exist to measure various physical quantities.

Name some imperial units of measure that you know: ________________

________________ ______________ _________________

________________ _____________ _________________

This system is NOT a decimal system. This system is based on **referents. A referent is an item an individual uses as a measurement unit for estimating**. The Imperial measurement system started in Ancient Roman Times. The current Emperor's foot length would have been the standard unit for measuring length (distances). This resulted in units that were different in different regions. In 1824, the units were standardized and became the Imperial System of Measurement. The length of a foot was standardized to equal 12 inches. Many units in the imperial system are based on the measurements of the human body.

A. Referents for Measurement Systems

In measurement, a **referent is a concrete object that approximates a measurement.** Some common referents are given in the table below for the Imperial system although a referent can be almost anything that is useful.

unit	abbreviation	symbol	referent	Relationship between units
inch	in	"	Length of thumb from tip to knuckle 	
foot	ft	'	Foot length  or Length from wrist to elbow	1 ft = 12 in
yard	yd		Arm span or Width of doorway or Normal walking stride 	1 yd = 3 ft 1 yd = 36 in
mile	mi		Distance walked in 20 minutes or 2000 steps or 15-20 city blocks or Distance average person can jog in 10 minutes 	1 mi = 1760 yd 1 mi = 5280 ft

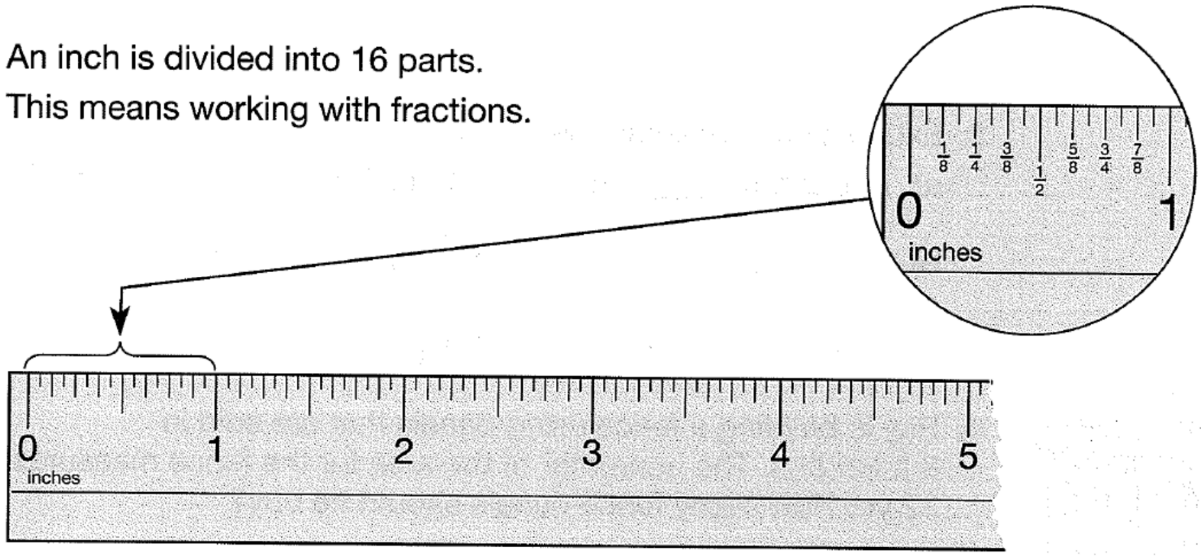
We can use referents if we don't have a measuring tool and simply want a quick estimate. If we wanted to estimate the length of a room in feet, we could walk heel to toe across the room, counting how many steps we took.

Estimate the length of your writing utensil in inches, using a referent:

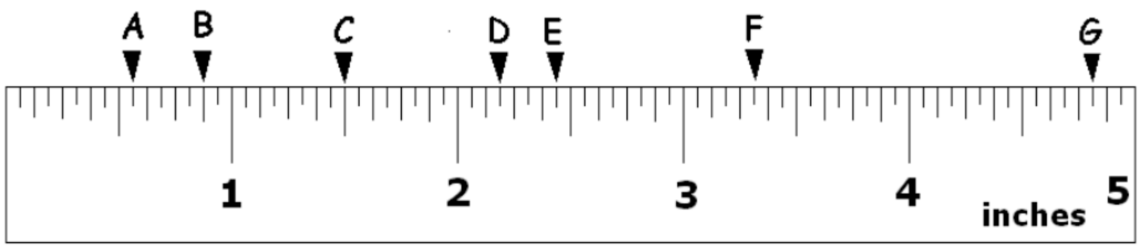
_______________ (We can write ______ inches; ______ in; or _______ ")

B. **Imperial Measurement**

Imperial lengths can be measured with rulers, yard sticks, or calipers. Many rulers marked with imperial units show one inch divided into quarters, eighths, and sixteenths. A fraction of an imperial measure of length is usually written in <u>fraction form</u>, **not decimal** form.



Notice that different lengths of lines indicate **sixteenths**, **eighths**, **quarters**, and **halves**.



Write the measurement in inches indicated by the following arrows, to the nearest 16th of an inch. Simplify fraction if possible.

A ______ B ______ C _______ D _______ E ______ F _______ G _______

= ______ = ______

A common abbreviation for 5 feet 2 inches is 5 ft. 2 in. or 5' 2".

Note: <u>5 ft. 2 in. is NOT the same as 5.2 feet</u>. See figure 1.

1 foot = 12 inches 1 foot is divided into 12 sections (inches)

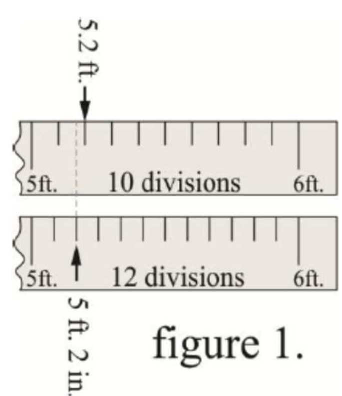


figure 1.

(5.2 is the same as $5\frac{2}{10}$ $feet$; 5 '2" is the same as $5\frac{2}{12}$ $feet$)

C. Conversion within the Imperial System

See p. 1 of booklet for "**conversion factors**" – a number used to multiply or divide a quantity to convert from one unit of measure to another. Multiplying/dividing a quantity by a conversion factor changes only its units, not its value.

- **To convert l<u>arger</u> units to <u>smaller</u> units : MULTIPLY**

To convert a larger unit to a smaller unit (ex ft to in),

1. First check the number of smaller units needed to make 1 larger unit.
2. Next, <u>MULTIPLY</u> that number by the number of larger units

When converting a larger unit to a smaller unit, the number ________________________

Think it through logically. If 1 foot = ____ inches, to find 6 feet in inches, <u>would we multiply or divide</u>? Should we have a <u>larger or smaller</u> number of inches than feet? Try it:

Example 1: Convert 7 yd to i) ft ii) in

i) Since 1 yd = _____ ft, we must ________________ 7 yd by ___ to get ft

7 yd = ______ ft

ii) On our formula sheet, we are not given the number of inches in a yard. But we know the number of inches in a foot and number of feet in a yard.

Since <u>1 yd = 3 ft</u>, we must <u>multiply</u> <u>7</u> yd by <u>3</u> to get ft (*as in i above*)

Next since 1 foot = _____ inches, we must ______________ _____ ft by ______ to get inches.

7 yd = ______ in

Example 2: Convert 5' 2'' (5 ft 2 in) to inches:

1. **Convert 5' to inches.** 5 ft = _____ inches

2. **Add 2 inches to your total in (1.↑)** 5 ft 2 in = _______ inches

_______inches + _______inches = _______ inches

- **To convert <u>smaller</u> units to <u>larger</u> units : DIVIDE**

1. First check the number of smaller units needed to make 1 larger unit.
2. Next, <u>DIVIDE</u> that number by the number of larger units

When converting a smaller unit to a larger unit, the number ______________________

Example: 12 inches = how many feet? _______

Example 3: Convert 51 in to: i) feet ii) feet and inches ii) yards, feet and inches

i) : **Convert 51 in to: feet**
Since 1 ft = _____ in, we must _______________ 51 in by ___ to get ft

51 in = ______ ft

ii) **Convert 51 in to: feet and inches**
Since <u>1 ft = 12 in</u>, we must **<u>divide</u> 51 in** by <u>12</u> to get ft. ________

- Take the **<u>whole</u>** number of <u>feet</u>, and <u>multiply by 36</u> to get back to inches. ________

- To find the **remainder**, <u>subtract inches from the initial total</u>. **The remainder is the inches amount.**

______ - _______ = __________

- Write amount as feet and inches **51 in = ______ ft** _____ in

iii) **Convert 51 in to: yards, feet and inches**

It may be easier to first calculate how many inches are in a yard.

1 foot = _____ inches. 1 yard = _____ feet

Therefore 1 yard = ________ feet = _______________ inches

How many inches are in 1 yard?

1 yd = 3 ft and 1 ft = 12 in.

3 ft/yd × ______ in./ft = ______ inches in 1 yard

Since 1 yd = ______ in, we must **divide** **51 in** by _____ to get yards. ________

- Take the **whole** number of yards, and multiply by 12 to get back to inches. _______
- To find the **remainder**, subtract inches from the initial total.

  ______ - _______ = __________

- To find the number of feet in the remainder, _______ by _______.
- Take the **whole** number of feet, and multiply by 12 to get back to inches. ________
- To find the **remainder**, subtract inches from the initial total. **The remainder is the inches amount.**

  ______ - _______ = __________

51 inches = ____ yd ______ ft _____ in

The previous method is perhaps best for one-step conversions: You use one conversion factor (the equivalence between two measures or units) to convert from the one unit to the other.

But sometimes conversions are more complicated, or you're not sure which unit is "bigger". For these sorts of conversion, we use as many conversion factors as we need, setting up a long multiplication so the **units** we don't want cancel out. Note: this is not numbers "cancelling out", like when you're multiplying fractions. Instead, this is treating the units ("feet", "miles", "seconds", etc) as though they were numbers, and cancelling them.

How do I know which way to put the ratios? How do I know which units go on top and which go underneath? Not important. Instead, start with the given measurement, write it down complete with its units, and then put one conversion ratio after another in line, so that whichever units you don't want are eventually cancelled out. If the units cancel correctly, then the numbers will take care of themselves.

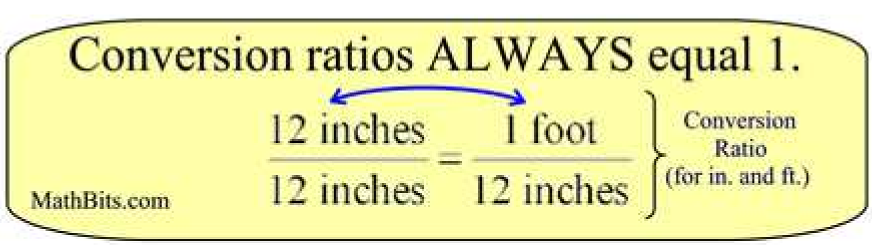
The fact that the conversion can be stated in terms of "1", and that **the conversion ratio equals "1"** no matter which value or unit is on top, is crucial to the process of cancelling units.

Setting up a unit cancellation table helps keep units straight. These tables are particularly useful when more than one unit conversion is necessary to obtain the desired unit.

Unit Analysis

Unit analysis is a method of converting or changing measures from one unit to another by multiplying the measure by a unit conversion factor in the form of a ratio (see p. 1 conversion factors). These conversion ratios specify how one unit of measurement is related to another unit of measurement. A unit conversion factor is a fraction in which **the numerator and denominator represent the same quantity, but in different units**. The ratio can be simplified to one. There is usually a **1** in the **numerator or denominator**.

The fraction below is a unit conversion factor that can be used to covert miles to feet. **Note that it can be simplified to one.**



Unit Analysis Method:

-First, make a unit cancellation table and write the number and units you are starting with in the left top box.

-Next, find the conversion factor for the units you want. When choosing a unit conversion factor, choose the one that cancels the units you **have** and replaces them with the units you **want**.

-Write unit conversion factor as a ratio in the form of a fraction (equal to 1, where numerator and denominator represent the same quantity, but in different units. Write it in such a way that all the units will cancel, except the unit you WANT. **When using unit analysis, the correct format will be such that after multiplication/division, the "have" ("from") units will cancel, and the answer will equal the "want" ("'to") units.**

-Then, cancel units, and multiply/divide. (**multiply** if in top row; **divide** if in bottom row) Write the final answer with the unit you "want" (the units you are converting "to").

How many inches are there in 18 feet? Use unit analysis.

18 ~~feet~~	12 inches
	1 ~~foot~~

18 x 12 in = 216. The answer is $\boxed{\text{18 feet = 216 inches.}}$

How many inches are in 42 miles?

42 miles = ______________________ inches

How many miles are in 158 400 inches?

158 400 inches = ________________ miles

The important points are:

-Write the conversion as a fraction (that equals one)
-Multiply it out (leaving all units in the answer)
-Cancel any units that are both top and bottom

Go back and try p. 5 example 1 ii using unit conversion

Try it:

1. **Convert 2 mi. to in.** 2 miles = ________________________________inches

2. **Convert 380160 in. to mi**. 80 160 inches = ______________miles

3. Anne is framing a picture. The perimeter of the framed picture is 136in.
   a) What will be the perimeter of the framed picture in feet and inches?

   b) The framing material is sold by the foot. It costs $1.89/ft. The material is not sold in partial feet. What will be the cost of material before taxes?

4. A school council has 6 yd of fabric that will be cut into strips 5 in. wide to make decorative banners for the school dance. How many banners can be made?

Can make ________________ complete banners.

Practice

Hint
1 foot = 12 inches
1 yard = 3 feet
1 mile = 1760 yards

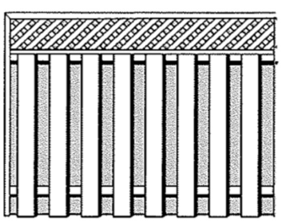
1. Express each measurement in inches.

a) 6 ft 2 in. = ______ in.
b) 4 ft 9 in. = ______ in.
c) 2 yd = ______ in.
d) 3 yd 1 ft = ______ in.
e) 5 yd 2 ft 3 in. = ______ in.
f) $5\frac{1}{2}$ yd = ______ in.

2. Pam is putting quarter-inch pieces of plywood in a stack. She has stacked 20 pieces so far. How high is the stack?

3. Express each measurement in feet.

a) 7 yd 2 ft = ______ ft
b) 12 yd 1 ft = ______ ft
c) 2 mi = ______ ft
d) 3 mi 5 yd 1 ft = ______ ft
e) $\frac{1}{2}$ mi = ______ ft
f) $2\frac{3}{4}$ mi = ______ ft



4. Ray is building a fence using panels that are sold in 8 ft lengths. The perimeter of the area for the fence measures 32 yd. How many fence panels should he buy?

5. Riley bought 50 feet of rope. He cut off pieces that total 34′ 8″ in length to use as tie-downs on his boat. How much rope does he have left?

Textbook work: p. 11 #3, 4, 5, 8, 9, 11a, 12,13, 14, 18

SECTION: 1.3 RELATING SI AND IMPERIAL UNITS p. 16

The SI (Metric) system of measures is based on powers of __________________.

Each measurement in the imperial system relates to a corresponding measurement in the SI system.

This table shows the approximate relationships between imperial units and SI units.

SI UNITS TO IMPERIAL UNITS	IMPERIAL UNITS TO SI UNITS
1 mm = $\frac{4}{100}$ in	1 in = 2.54 cm
1 cm = $\frac{4}{10}$ in	1 ft = 30.48 cm 1 ft = 0.3048 m
1 m = 39 in 1 m = 3 $\frac{1}{4}$ ft 1 m = 3.280839895 ft	1 yd = 90 cm 1 yd = 0.9 m
1 km = $\frac{6}{10}$ mi 1 km = 0.62137119 mi	1 mi = 1.609344 km

We can use the conversion factors in the box on <u>front page of booklet</u> to convert between SI units and imperial units of measure.

To convert between units, we can simply multiply/divide or we can use our unit cancellation table.
Example 1:

A bowling lane is approximately 19 m long. What is this measurement to the nearest foot? **19 m ≈ _______ feet**

(Think of a metre stick to know the length of a meter. Think of a long school ruler to think of the length of a foot (12 inches). There are about _____ feet in a metre. The answer in feet should be __________ than metres.)

smaller ➔ larger DIVIDE larger ➔ smaller MULTIPLY

Example 2:

After meeting in Emerson, Manitoba, Hannah drove 62 mi south and Faith drove 98 km north. Who drove farther?

(Convert one to the same unit as the other. Choice. Both in miles or both in km.)

Convert 62 mi to km: ___________________ km is _______________ 98 km

__________ drove further.

Convert 98 km to mi: ____________________ mi is _______________ 62 mi

__________ drove further.

We may need to complete <u>more than one conversion</u> if what we want is not on the conversion factor chart.

☞For example, you may need to change from Imperial to SI first , then convert the SI units to the desired unit.

Example 3:

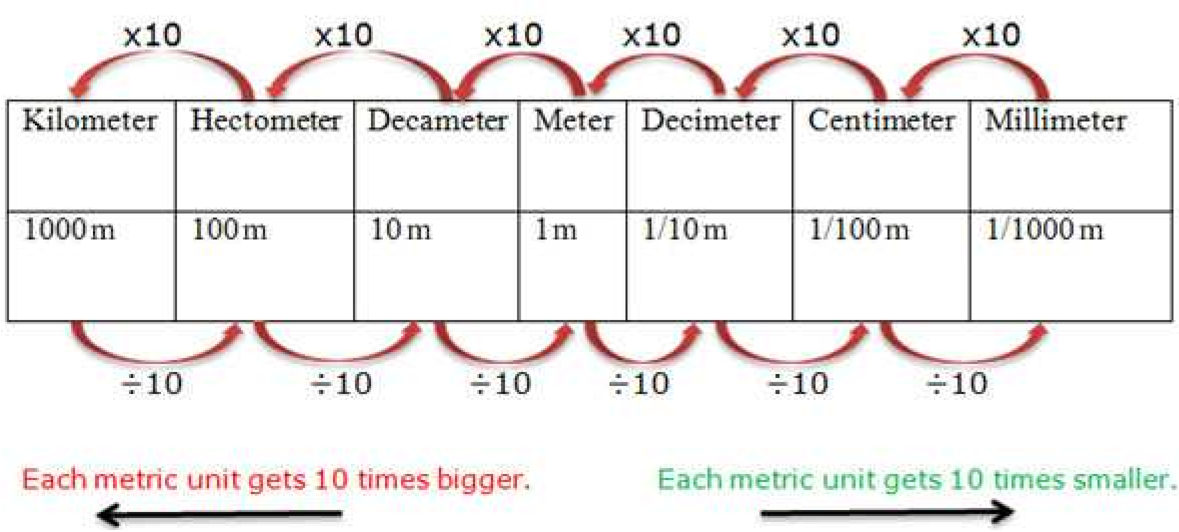
Alex is 6 ft 2 in tall. To list his height on his driver's license application, Alex needs to convert this measurement to centimeters.

a) What is Alex's height to the nearest centimeter?

b) Use mental math and an estimation to justify that the answer is reasonable.

(Remember there are about 3 feet in a metre. And a metre is the length of a metre stick.)

Remember:



Try it:

At least once a year, a truck will get stuck on the High Level Bridge in Edmonton. The bridge has a low clearance of $10'\,6''$. A truck driver knows that her semitrailer is 3.3 m high. Will her vehicle fit under the bridge? Or will she be stopping traffic? Justify the answer.

How could the truck driver get the trailer to fit?

Metric Review:

Each of the following objects have been measured with inappropriate units. Convert them to more suitable units.

1. thickness of a dime 0.00122 m

2; height of a basketball player 2100 mm

3. driving distance from Pincher Creek to Taber is 14 900 000 cm

1 About how many centimetres are there in an inch?

1 in. ≐ _______ cm

2 About how many centimetres are there in a foot?

1 ft ≐ _______ cm

3 About how many centimetres are there in a yard?

1 yd ≐ _______ cm

4 Circle the greater measurement in each pair.

a) 6 in. or 10 cm

b) 5 ft or 125 cm

c) 10 yd or 10 m

d) 25′ or 8 m

5 Circle the larger unit in each pair.

centimetre or metre

millimetre or decimetre

hectometre or kilometre

decametre or centimetre

6 How many centimetres are in 5 m?

1 m = 100 cm, so 5 m is _______ m × 100 cm/m = _______ cm

7 How many metres are in 8.5 km?

1 km = 1000 m, so 8.5 km × _______ m/km = _______ m

8 a) 1 cm = _______ mm

b) 1 m = _______ cm

c) 1 km = _______ m

d) 45 cm = _______m

e) 1330 m = ________km

f) 45 mm = ______ cm

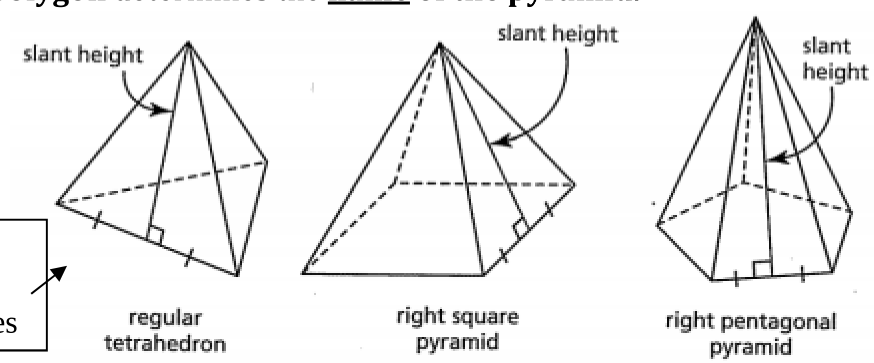
Textbook work: p. 22-23 #4-6, 7a, 8, 10, 15

Surface area is measured in ______________________________ ______________________ .

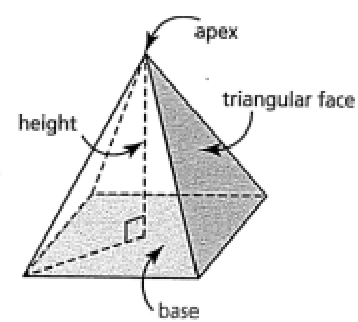
Right Pyramids

- The ________________________ is the total area on the surface of an object.
- A ______________________ is a 3 – dimensional shape that has triangular faces and a base that is a polygon. The apex of the shape is directly above the centre of the base.
- A right **regular** pyramid has a base that is a **regular polygon** (all sides equal), which makes all the lateral faces the same.
- The **shape of the polygon** determines the **name of the pyramid**.

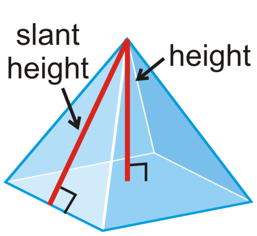
Tetrahedron: base and sides are **equilateral** triangles



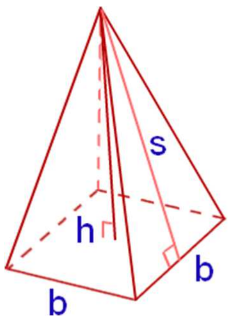
- The triangular faces meet at a point called the ____________________.
- The height of the pyramid is the ______________________ distance from the apex to the centre of the base.

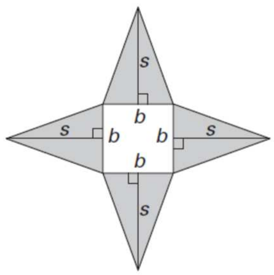


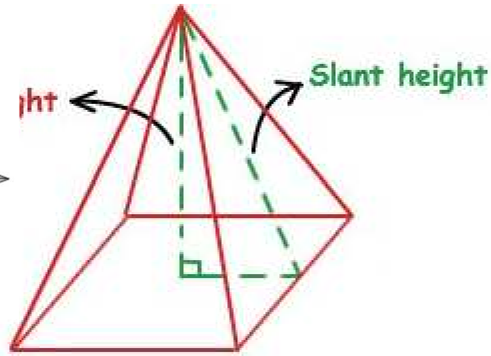
- When the _________________ of a pyramid is a regular polygon, the triangular faces are **congruent** (all the same). All **regular** pyramids have a slant height, which is the height of a lateral face. __________________________________ of the regular right pyramid is the height of a triangular face (a lateral face).

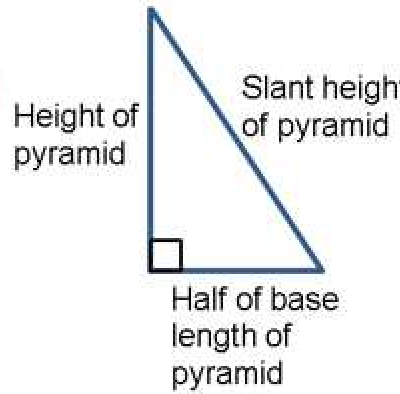


- The <u>slant height</u> of a right pyramid is the <u>hypotenuse</u> of the right triangle formed by the height and half the base length. (***r*** is half the length of the base).





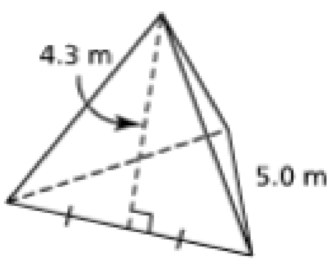




- The ______________________________ of a right pyramid is the sum of the areas of the triangular faces and the base.

- **Example 1**

Calculate the surface area of this regular tetrahedron to the nearest square meter.

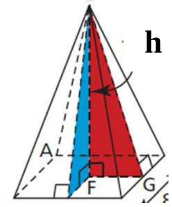


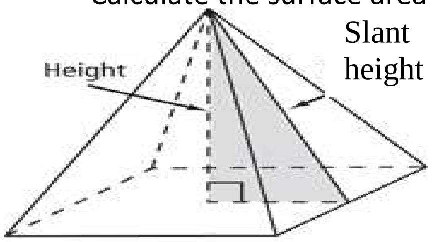
Find the area of one lateral face (one equilateral triangle). (area of triangle:

A tetrahedron is made up of ______ equilateral triangles. Take the area of one triangle and multiply by _____ to get the surface area of this tetrahedron.

Example 2

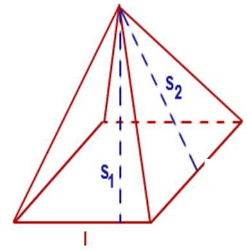
A right rectangular pyramid has base dimensions 4m by 6m, and a height of 8m. Calculate the surface area of the pyramid to the nearest square metre.





"Right rectangular pyramid" means the base is a _______________________________. This means that the lateral faces are 2 pairs of ___________ triangles.

We can find the **base**: A = _________



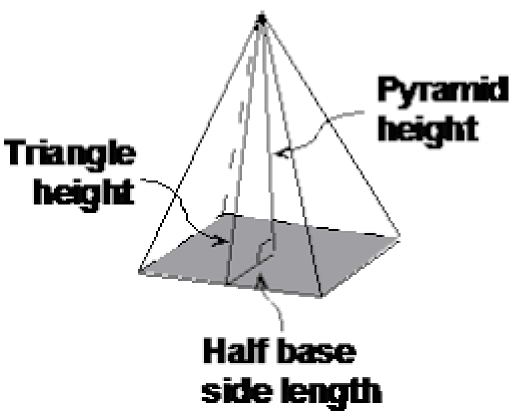
For the triangles, we need the base (which we know) and the height (which is the slant height of the pyramid. The slant height is the hypotenuse of the triangle formed with the base height of the pyramid (*see previous page for more info*).

For the two side triangles, think of the right triangle.

hyptotenuse = _______ r = $\frac{1}{2}$ width of base ________ . Find the slant height.

Now find the **area** of **one side triangle.**

Repeat the process for the triangles at the front and back.

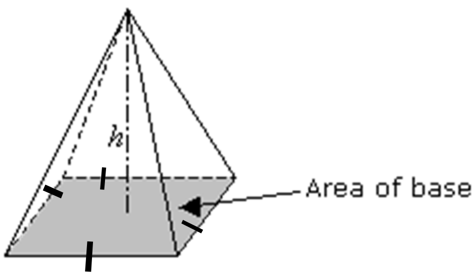


Total area of this pyramid = 2 triangles + two triangles + base

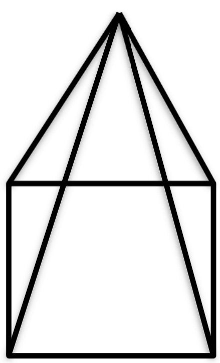
Formula: Surface area of Right pyramid with Regular polygon base

Instead of finding the sum of all the faces of a right regular pyramid, we can use this formula. (**base** has to have **all sides equal** for this formula). "s" is the slant height.

Surface area = $\frac{1}{2}$ s (perimeter of base) + base area

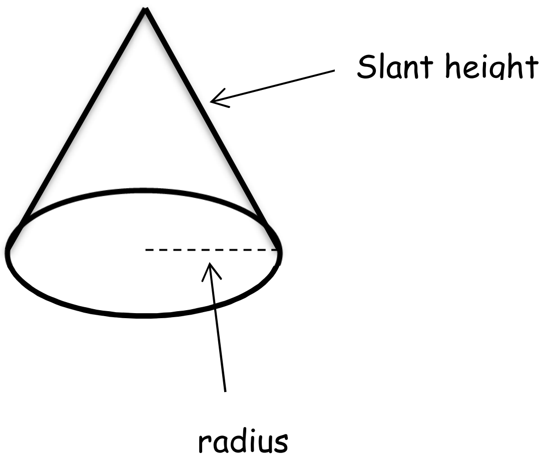


Example 3: The surface area of the lateral triangular faces on a right squared pyramid is 3000in^2. The side length of its base is 30 in. Determine the height to a tenth of an inch.



Right Cones

Surface area formula:



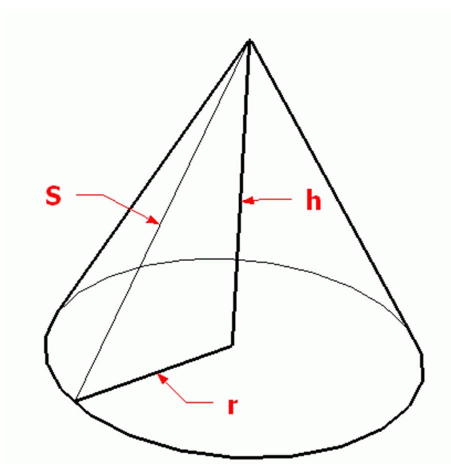
$$SA = \pi r^2 + \pi rs$$

r = radius

s = slant height

Example 1

A right cone has a base radius of 3 m and a height of 10 m. Calculate the surface area of this cone to the nearest square metre.



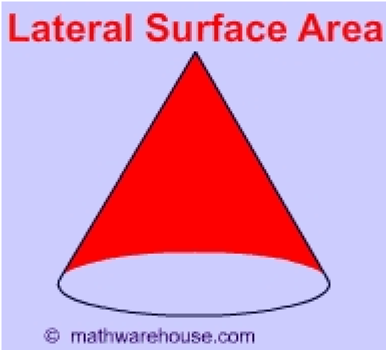
To find the surface area, we need the slant height.

The radius and height of a cone are perpendicular. The slant height forms the hypotenuse of the right triangle that contains the height and radius.

Use Pythagoras.

Example 2

The lateral surface area of a cone is 220 cm^2. The diameter of the cone is 10 cm. Determine the height of the cone to the nearest tenth of a centimetre.



Text work: pyramids p. 34 #4,5, 8a, 13 cones #6,7,8b,11

1.5 <u>VOLUME</u> OF <u>RIGHT PYRAMIDS</u> <u>AND RIGHT CONES</u> (p. 36)

Write in COMPLETE SENTENCES.
Use your textbook – pages 36 to 41.

1. What is volume? (*yellow box p. 36*)

   Volume is ____

   ____

   ____

   It is measured in ____________________ units..

2. What is **capacity**?

   Capacity is ____

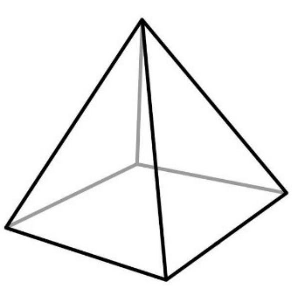
____

____

It is measured in ________________ units or __________________ units (like litre, milliliter, ounce, gallon, etc.)

3. Write at least one or two examples of the units we use for volume.

4. Write the **formula** for the <u>volume</u> of a **right rectangular pyramid.** What does each of the letters mean? Label this diagram (use a ruler) like on p. 39.



l - __________

w - ___________

h - ________________

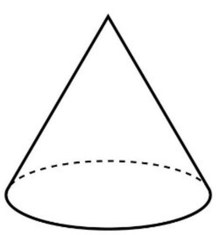
5. What theorem might will you use to find missing parts of the formula? (p. 38)

   ____

6. Read the examples on pages 38 and 39. Do you understand them? If not, read them again. Identify parts that confuse you.

7. Try the "Check Your Understanding" question on page 39. Check your answer.

8. Write the formula for the volume of a right cone. What does each of the letters mean? Label this diagram (use a ruler) like on p. 40.



r - __________

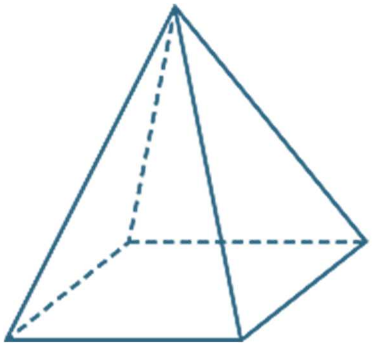
h - ________________

9. Read the examples on pages 40 and 41. Do you understand them? If not, read the examples again. Identify parts that confuse you.

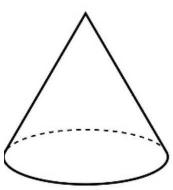
10. Try the "Check Your Understanding" question on page 40. Check your answer.

Try it:

Try the "Check Your Understanding" question on page 38 Check your answer.



Try the "Check Your Understanding" question on page 41 Check your answer.



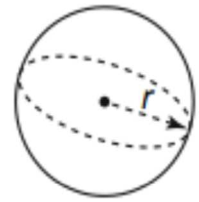
Textbook PRACTICE: Choose at least 7 of the following questions to try, starting on page 42: 4 to 13. Check your answers with the answers in the back of the book.

1.6 VOLUME and SURFACE AREA of SPHERES (p. 47)

- **SURFACE AREA OF A SPHERE p. 45**

To find the surface area of a sphere, use this formula:

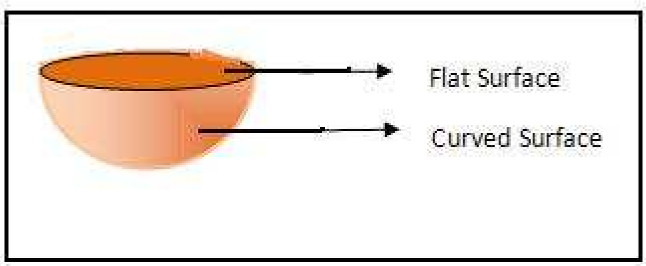
$SA = 4\pi r^2$



To find the surface area of a hemisphere, use this formula:

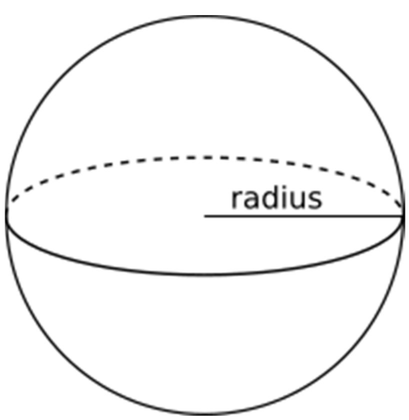
$SA = 3\pi r^2$

(Hemisphere is half of a **sphere**. It is half the surface area of curved surface of the sphere, PLUS the circle that is the flat surface of the hemisphere. $\therefore SA = \frac{1}{2}(4\pi r^2) + \pi r^2 = 2\pi r^2 + \pi r^2 = 3\pi r^2$)



Example 1

A glass sphere has radius 25 cm. What is the surface area of the sphere, to the nearest square centimetre?



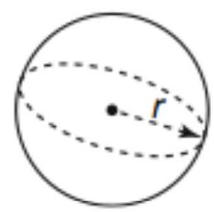
Example 2

A globe has surface area 2735 cm^2. Find the radius of the globe, to the nearest tenth of a centimetre.

- **VOLUME OF A SPHERE p. 49**

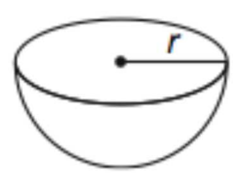
To find the volume of a sphere, use this formula:

$$V = \frac{4}{3}\pi r^3$$



To find the volume of a hemisphere, use this formula:

$$V = \frac{2}{3}\pi r^3$$



(For volume of hemisphere, we simply divide the volune of sphere in half.)

Example 3

A sphere has diameter 8 yd. What is the **volume of the sphere,** to the nearest cubic yard?

Example 4

A hemisphere has radius 6.0 cm.

a) What is the **surface area** of the hemisphere to the nearest tenth of a square centimetre?

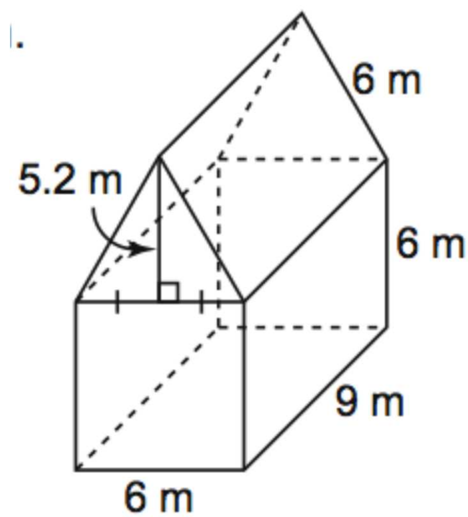
b) What is the **volume** of the hemisphere to the nearest tenth of a cubic centimetre?

Textbook work: p. 51 #3c, 4c, 5, 8, 9, 10, 11

1.7 SOLVING PROBLEMS INVOLVING OBJECTS p. 55

- A ______________________________ object compromises of two or more distinct objects.
- To determine the **volume of a composite object**, identify the ______________________ objects, calculate the volume of each object and then add the volumes.
- To calculate the **surface area of a composite object**, the first step is to ____________________________ the faces that make up the surface area. Then ____ the sum of the areas of those faces.
- Surface Area of a Composite Object

Be careful. Look at the object to the right. To calculate the surface area, it's not just calculating the sum of areas of a triangular and rectangular prism. Note that these two prisms are attached. **We don't include the base of the triangular prism or the top of the rectangular prism.** If you like, you add the areas of the two shapes and then subtract the **two** rectangles that **overlap** that are not part of the exterior surface area.

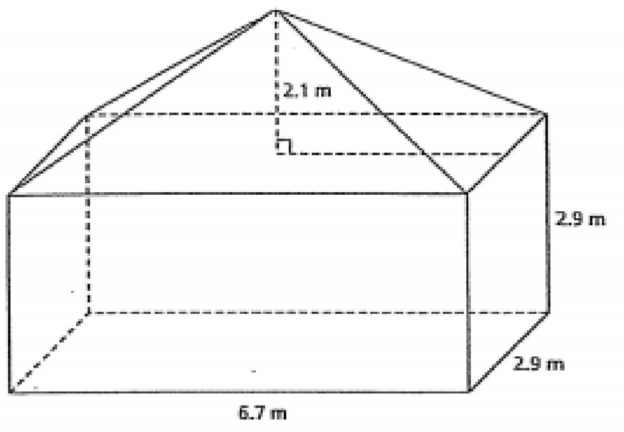


Example 1

A sphere of flavoured ice is served in a cylinder shaped paper cup. The cup has a diameter 6 cm and height 10 cm. For the moment before the ice starts melting, the sphere has the same diameter as the cup. To the nearest cubic centimetre, how much space is left inside the cup? (Hint: One-half of the sphere is below the rim of the cup.) Sketch it!

Example 2

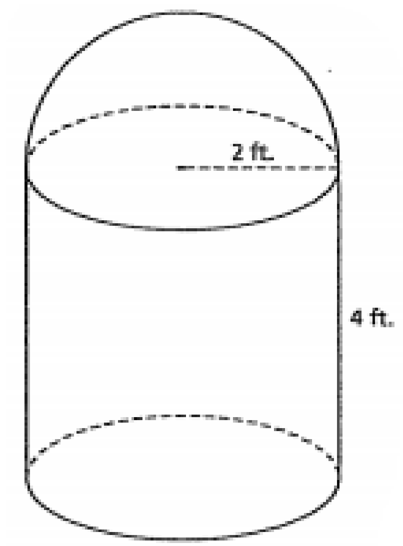
a) Determine the volume of this object to the nearest tenth of a cubic meter. 69.9 cm³
(You are finding out **how much space is INSIDE** this object.)



b) Calculate the <u>surface area</u> of this object to the nearest **square foot. (Hint: convert all dimensions BEFORE calculating the surface area**). (You are calculating the **sum** of **areas** of **all the flat surfaces** (**faces**) on **OUTSIDE** of this shape.)

Example 3

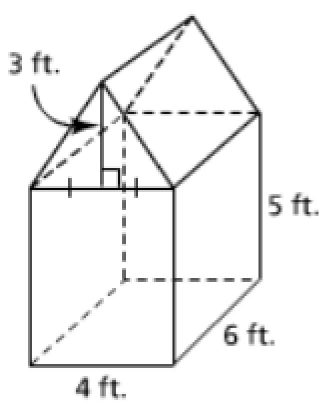
Calculate the surface area of this object to the nearest square foot. (88 ft^2)



Example 4

A tool shed is formed by a rectangular prism with a triangular prism as its roof. Determine the surface area of the tool shed to the nearest square foot.

You can calculate the surface area without knowing the formulas for the two shapes that make up the composite. Just look at what rectangles and triangles make up exterior of the tool shed. ***Note that for the two equal rectangles of the roof, you can use Pythagoras to find the width.*** (see p. 58 for similar example). 155 ft^2



Textbook work: p. 59 3a, 3b, 3d, 4a, 4d, 6